

sub
At WHAT IS CLAIMED IS:

1. A method comprising:
acquiring first data representing a three-dimensional surface of at
5 least a portion of a patient's body while the patient is in a first position; and
acquiring second data representing at least one internal portion of
the patient's body while the patient is in the first position.
2. A method according to Claim 1, further comprising:
10 determining a radiation treatment plan based on the first data, the
second data, and on data representing a physical layout of a radiation
treatment station.
3. A method according to Claim 2, wherein the step of determining the
15 radiation treatment plan comprises:
determining a position of a radiation treatment device that will avoid
the patient's body and that will allow irradiation of a portion of the at least
one internal portion.
4. A method according to Claim 1, wherein the first position is a
20 position that is substantially maintained during a computed tomography
scan, the method further comprising:
acquiring third data representing a three-dimensional surface of at
least a portion of the patient's body while the patient is in a second position
25 substantially maintained in preparation for radiation treatment.
5. A method according to Claim 4, further comprising:
determining, based on the first data and the third data, that the
second position does not correspond to the first position.
30
6. A method according to Claim 5, further comprising:

instructing the patient to move so that the second position corresponds to the first position.

7. A method according to Claim 5, further comprising:

5 changing a radiation treatment plan for the patient based on a difference between the first position and the second position.

8. A method according to Claim 1, further comprising:

10 determining, based on the first data and the third data, that the patient represented by the first data is different from the patient represented by the third data.

all CR
9. A method according to Claim 4, further comprising:

15 determining, based on the first data and the third data, that the patient's body has changed by greater than a threshold amount; and in response to the determination that the patient's body has changed by greater than the threshold amount, acquiring fourth data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a third position substantially 20 maintained during a second computed tomography scan.

10. A method according to Claim 1, further comprising:

25 acquiring third data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a second position; and

activating a radiation beam according to a radiation treatment plan if it is determined based on the third data that the second position corresponds to a point in a cycle of body motion specified by the treatment plan.

30 *A*
11. A method according to Claim 10, further comprising:

acquiring fourth data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a third position; and

5 deactivating the radiation beam according to a radiation treatment plan if it is determined based on the fourth data that the third position does not correspond to the point specified by the treatment plan.

12. A method comprising:

10 acquiring computed tomography data of a patient while the patient remains substantially in a first position;

acquiring first three-dimensional data representing a surface of the patient while the patient remains substantially in the first position;

determining a radiation treatment plan based on the computed tomography data, the three-dimensional data, and data representing a

15 physical layout of a radiation treatment station;

acquiring second three-dimensional data representing a surface of the patient while the patient remains substantially in a second position at the radiation treatment station;

20 determining if the second three-dimensional data corresponds to the first three-dimensional data; and

delivering radiation to the patient according to the radiation treatment plan if it is determined that the second three-dimensional data corresponds to the first three-dimensional data.

25 13. A system comprising:

a computed tomography scanning device for acquiring computed tomography data of a patient while the patient is in a scanning position; and

30 a first surface photogrammetry device for acquiring first three-dimensional surface data of at least a portion of the patient's body while the patient is in the scanning position.

14. A system according to Claim 13, further comprising:
a treatment planning device for generating a radiation treatment
plan based on the computed tomography data, the first three-dimensional
5 surface data, and data representing a physical layout of a radiation
treatment station.

15. A system according to Claim 13, further comprising:
a radiation treatment device for delivering radiation to the patient;
10 a second surface photogrammetry device for acquiring second
three-dimensional surface data of at least a portion of the patient's body
while the patient is in a treatment position on the radiation treatment
device;
a controller for determining if the treatment position corresponds to
15 the scanning position based on the first three-dimensional surface data
and the second three-dimensional surface data.

16. A system according to Claim 15, wherein the first surface
photogrammetry device and the second surface photogrammetry device
20 are a same device.

17. A medium storing controller-executable process steps, the process
steps comprising:
a step to acquire first data representing a three-dimensional surface
25 of at least a portion of a patient's body while the patient is in a first position;
and
a step to acquire second data representing at least one internal
portion of the patient's body while the patient is in the first position.

30 18. A medium according to Claim 17, the process steps further
comprising:

a step to determine a radiation treatment plan based on the first data, the second data, and data representing a physical layout of a radiation treatment station.

5 19. A medium according to Claim 17, wherein the first position is a position that is substantially maintained during a computed tomography scan, the process steps further comprising:

10 a step to acquire third data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a second position substantially maintained in preparation for radiation treatment.

15 20. A medium according to Claim 19, the process steps further comprising:

20 a step to determine, based on the first data and the third data, that the patient's body has changed by greater than a threshold amount; and

25 a step to acquire, in response to the determination that the patient's body has changed by greater than the threshold amount, fourth data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a third position substantially maintained during a second computed tomography scan.

30 21. A medium according to Claim 17, the process steps further comprising:

35 a step to acquire third data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a second position; and

40 a step to activate a radiation beam according to a radiation treatment plan if it is determined, based on the third data, that the second position corresponds to a position specified by the treatment plan.

22. A medium according to Claim 17, the process steps further comprising:

a step to acquire third data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a second position; and

5 a step to activate a radiation beam according to a radiation treatment plan if it is determined based on the third data that the second position corresponds to a point in a cycle of body motion specified by the treatment plan.

10

23. A medium according to Claim 22, the process steps further comprising:

a step to acquire fourth data representing a three-dimensional surface of at least a portion of the patient's body while the patient is in a

15 third position; and

a step to deactivate the radiation beam according to a radiation treatment plan if it is determined based on the fourth data that the third position does not correspond to the point specified by the treatment plan.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100